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Claims

[c1] A method of fabricating a superconducting magnet coil support structure comprising:
designing a preformed support tooling for the superconducting magnet coil support structure;
fabricating said preformed support tooling;
performing a wet winding process to form said superconducting magnet coil support structure comprising;
winding a first resin material onto said preformed support tooling to form a base; and
applying a second resin material onto said base to form a plurality of spacers and a plurality of pockets on said base; and
curing said superconducting magnet coil support structure; and
removing said preformed support tooling from said superconducting magnet coil support structure.

[c2] A method as in claim 1 wherein the step of designing said preformed support tooling further comprising:
determining dimensions of the superconducting magnet;
determining dimensions of space available for said superconducting magnet coil support structure;

determining a mounting configuration of said superconducting magnet coil support structure;
designing dimensions of said superconducting magnet coil support structure to accommodate for said dimensions of said superconducting magnet, said dimensions of space available, and said mounting configuration; and
designing dimensions of said preformed support tooling.

[c3] A method as in claim 1 wherein the step of performing a wet winding process further comprises:
winding prepreg onto said preformed support tooling to form a base; and
applying fiber cloth onto said base to form a plurality of spacers and a plurality of pockets on said base.

[c4] A method as in claim 1 wherein the step of performing a wet winding process further comprises:
winding said first resin material onto said preformed support tooling to form a base; then
inserting said base into a vacuum chamber;
curing said base; and
applying said second resin material onto said base.

[c5] A method as in claim 1 wherein applying a first resin material and applying a second resin material comprises applying a resin material selected from at least one of prepreg, E-glass, S-glass, fiberglass tape with epoxy,

fiber cloth with epoxy, and fiber strands with epoxy.

[c6] A method as in claim 1 wherein the step of performing a wet winding process further comprises winding fiber cloth having strands of fiber onto said preformed support tooling.

[c7] A method as in claim 6 wherein the step of winding fiber cloth onto said preformed support tooling further comprises varying the widths of said fiber cloth to form said plurality of spacers and said plurality of pockets.

[c8] A method as is claim 7 wherein the step of forming said plurality of spacers further comprises matching the dimensions and geometries of said plurality of spacers to the dimensions and geometries, respectively, of gaps between superconducting magnet coils.

[c9] A method as is claim 7 wherein the step of forming said plurality of pockets further comprises matching the dimensions and geometries of said plurality of pockets to the dimensions and geometries of said superconducting magnet.

[c10] A method as in claim 6 wherein the step of winding fiber cloth is performed by a computer numerically controlled (CNC) multi-axis winder.

[c11] A superconducting magnet coil support structure formed according to the method of claim 1.

[c12] A superconducting magnet coil support structure comprising:
a solid body comprising;
an interior portion having a base formed of a first resin material;
an exterior side having a plurality of spacers and a plurality of pockets that have dimensions corresponding to dimensions of a superconducting magnet, said plurality of spacers are coupled to said base and are formed of a second resin material; and
an interior side;
wherein said exterior side, said interior portion, and said interior side comprises varying width material.

[c13] A system as claimed in claim 13 wherein said exterior side, said interior portion, and said interior side integrally forms a unitary solid body.

[c14] A system as claimed in claim 13 wherein said superconducting magnet coil support structure is formed from a plurality of fiber cloths having a variety of widths.

[c15] A system as claimed in claim 13 wherein said interior side is cylindrical shaped.

[c16] A system as claimed in claim 13 wherein a contour of said exterior side corresponds to a contour of the exterior side of a superconducting magnet.

[c17] A system as claimed in claim 13 wherein dimensions and geometries of said plurality of spacers corresponds to dimensions and geometries, respectively, of gaps between superconducting magnet coils.

[c18] A system as claimed in claim 13 wherein dimensions and geometries of said plurality of pockets corresponds to dimensions and geometries, respectively, of said superconducting magnet.

[c19] A system as claimed in claim 13 wherein said superconducting magnet coil support structure is toroidal shaped.

[c20] A system as claimed in claim 13 wherein said superconducting magnet coil support structure has a hollow interior portion.